with open repair; however, concerns about long-term durability remain. This analysis evaluated the incidence of secondary interventions (SI) after TEVAR and determined functional outcomes and survival.

Methods: A retrospective review was completed of all TEVAR patients from 2004 to 2011. Patients with SI were further analyzed. A validated questionnaire (Eastern Cooperative Oncology Group score) was used to assess ability to perform activities of daily living. Kaplan-Meier analysis was used to estimate survival.

Results: Of 587 patients, 78 (13%) required SI at median ± standard deviation of 4.7 months (11.5 ± 16.5, Fig 1). Seventeen (22%) underwent multiple SI. Forty (6.8%) initially underwent endovascular revision, with six (15%) requiring subsequent open reintervention. Thirty-eight (6.5%) initially had open revision, with six (16%) requiring subsequent endovascular remediation. Median time to endovascular SI was 7.6 months (16.0 ± 18.8), which was significantly longer than time to open SI (1.9; 6.9 ± 12.3 months; $P = .01$). SI incidence differed significantly amongst various indications ($P = .005$): acute dissection (24.7%), chronic dissection (16.5%), degenerative aneurysm (14.1%), traumatic transection (8.3%), penetrating ulcer (1.5%), and other miscellaneous (thoracoabdominal aneurysms, mycotic aneurysms, pseudoaneurysms, 17.8%. Most common indications for SI after acute/chronic dissection were persistent false lumen perfusion and/or proximal/distal extension of disease, whereas for degenerative aneurysms, SI was performed primarily to treat type I/III endoleaks. SI patients had more comorbidities ($P < .0001$) and greater number of postoperative complications after the index TEVAR ($P < .0001$) compared with those without SI. No survival difference was noted between the groups (SI vs No SI; $P = .93$; Fig 2). At median follow-up of 20.4 months (range, 6-52 months), functional status was significantly better among patients first treated with endovascular SI compared with open revision (Eastern Cooperative Oncology Group scale: 1.7 ± 2.1 vs 2.7 ± 2.1; $P = .04$).

Conclusions: SI after TEVAR is common, particularly amongst patients treated for acute dissection, which underscores the need for vigilant surveillance. Although significant functional impairment is noted after SI for TEVAR, patients can be successfully treated with open and endovascular techniques with no significant increase in long-term mortality.

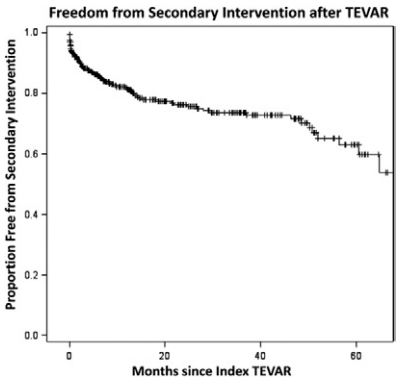

Fig 1.

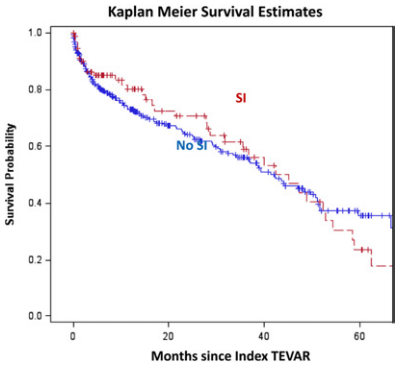

Fig 2.

Treatment and 4-Year Follow-Up of 163 Stanford Type B Aortic Dissections: A Single-Center Experience

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Objectives: Endovascular treatment of Stanford type B aortic dissection is becoming more prevalent. This study analyzed the data of patients in our department with this type of dissection, and compared the results of endovascular treatment vs medical treatment.

Methods: Between January 2005 and April 2009, 163 patients with the diagnosis of Stanford type B dissection were studied. Mean age was 52.71 ± 11.46 years. All patients were treated with antihypertension drugs when admitted. The indication for routine endovascular repair was progressive blood flow into a false lumen. Indications for emergency endovascular repair were impending rupture, uncontrollable hypertension, malperfusion syndrome, and intractable pain. Patients were followed up after discharge.

Results: Total mortality was 9.82% (16 of 163). Ninety-three patients were treated by endovascular repair, and 70 were treated conservatively. The longest follow-up time was 50 months. Kaplan-Meier curve was used to compare the survival rate of the two groups. Log-rank test showed that the survival rate of the endovascular repair group was higher than in the conservative treatment group ($P = .004$). Cox regression was used to demonstrate the most significant factors related to risk of death. Patients with conservative treatment ($P = .005$) along with lower oxygen saturation in the blood ($P = .0004$) had higher mortality.

Conclusions: In short to medium follow-up, the survival rate of endovascular repair to Stanford type B dissection is higher than medical treatment.

Ambulatory Percutaneous Endovascular Abdominal Aortic Aneurysm Repair

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Objectives: Percutaneous endovascular aneurysm repair (PEVAR) has been associated with less groin wound complications and shorter operation times, but same day discharge (SDD) has not been reported. We have been performing PEVAR (Preclose/Proglide technique) since 2005 and noted that all early failures occurred and were addressed in the operating room (OR), with no further events overnight. The goal of this study was to report the feasibility and safety of ambulatory PEVAR in selected patients.

Methods: Consecutive patients who underwent elective EVAR between March 2011 and July 2012 were reviewed. Patients who were functionally independent, without significant comorbidities, and favorable anatomy for PEVAR were given the option to be discharged the evening of the PEVAR after 6 hours of bedrest, if the procedure was uneventful. Causes for discharge delay and early outcomes were analyzed.

Results: During the study period, 58 patients underwent abdominal aortic aneurysm (AAA) repair, and 46 (mean age, 71.0 ± 10.4; range, 59-97 years) had elective EVAR. Exclusions included one rupture, five acute presentations, two fenestrated EVAR, and four open AAA repairs. Thirty-seven (77%) had bilateral percutaneous, six had unilateral percutaneous, and the remaining had bilateral endarterectomy. Percutaneous success rate was 98% (2 conversions for inadequate hemostasis). Mean length of stay was 1.4 ± 1.5 days (median, 1 day) with no 30-day mortality or readmission. Fourteen patients (30%) were discharged the same day, 17 (37%) on postoperative day 1, 12 (26%) on postoperative day 2/3, and three (7%) stayed ≥4 days. There were no groin complications. Of the 17 patients who were discharged on postoperative day 1 (instead of the same day), 10 were due to significant COPD, CAD, or advanced age, three transportation issues, two inability to void, and two patient preference. Patients in the SDD group were significantly younger (66.4 ± 5.6 vs 73.1 ± 11.3 years, $P = .041$), had smaller AAA (5.2 ± 0.6 vs 5.8 ± 1.0 cm, $P = .07$), less blood loss (126 ± 103 vs 253 ± 209 mL, $P = .037$), and OR time (80 ± 26 vs 143 ± 106 minutes, $P = .036$). There were fewer ASA 4 patients in the SDD group (21% vs 44%, $P = .139$). Most patients had general anesthesia in the SDD group (79% vs 72% for the rest, $P = .634$).

Conclusions: Ambulatory PEVAR is feasible and safe in 30% of patients undergoing elective EVAR, who do not have excessive medical risk, have good functional capacity, and undergo an uneventful procedure. If the hospital reimbursement issues can be resolved, decreasing the length of stay would potentially improve cost-effectiveness of EVAR.

Fenestrated and Branched Endovascular Aortic Aneurysm Repair Among Octogenarians

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Objectives: Octogenarians are frequently denied open repair of complex abdominal aortic aneurysms (AAAs) and thoracoabdominal aortic aneurysms (TAAA) because of their increased surgical risk. Fenestrated endovascular aortic aneurysm repair (FEVAR) is an alternative to open repair of complex AAAs in high-risk patients. The purpose of this study was to assess perioperative outcomes of FEVAR among octogenarians.

Methods: During a 24-month period, 84 high-risk patients (75 men and 8 women) underwent FEVAR using physician-modified fenestrated Zenith endografts. Of these, 19 patients (23%; 15 men and 4 women) were octogenarians. Technical success was defined as complete exclusion of the aneurysm with successful catheterization and patent target arteries.

Results: Median age was 72 years (interquartile [IQR] range, 65-79 years) for the entire cohort and 83 years (IQR, 81-86 years) among octogenarians. All octogenarians were considered unfit for open repair and had a median Society for Vascular Surgery comorbidity score of 16 (IQR, 12-18). More octogenarians presented with symptomatic aneurysms (45% vs 10%) and severe aortoiliac occlusive disease (40% vs 25%). Their median aneurysm size was 6.2 cm (IQR, 5.4-6.8 cm). Most aortic aneurysms in octogenarians were suprarenal (50%); 28% were thoracoabdominal, and 32% were juxtarenal. Endografts were customized to include 52 fenestrations/branches (33 renal, 12 superior mesenteric, and 6 celiac arteries). Octogenarians were more likely to have unfavorable anatomy (42% vs 22%) because of severe suprarenal neck angulation (16%), reverse taper neck (16%), and circumferential thrombus at the renal arteries (11%). Three patients presented with severe preprocedural renal stenosis and two with visceral artery stenosis. Technical success for stenting of the fenestrated/branched arteries was 98% (51 of 52). One renal artery was lost in a patient with unfavorable anatomy. No mesenteric arteries were lost. Median procedure time was 267 minutes (IQR, 158-339 minutes), and median fluoroscopy time was 79 minutes (IQR, 66-91 minutes). No 30-day mortality occurred. Median hospital stay was 7 days (IQR, 6-9 days). Prolonged ileus (21%), blue toe syndrome (11%), access vessel injury (11%), worsening renal insufficiency (11%), pneumonia (5%), and renal artery dissection (5%) were the most frequent complications. No periprocedural paraplegia or strokes occurred.

Conclusions: FEVAR is safe and effective in the treatment of complex aortic aneurysms in octogenarians, even in those with unfavorable anatomy. Further evaluation of this technique in octogenarians is needed to define long-term outcomes, durability of the repair and effects on patient survival.

Impact of Uninterrupted Use of Clopidogrel on Postoperative Complications After Extracavitary Vascular Surgical Procedures

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Objectives: Patients with vascular disease commonly need a potent antiplatelet medical regimen, whose impact on complications remains unclear. In this study we sought to determine the role of uninterrupted use of clopidogrel on bleeding and perioperative complications in patients undergoing open extracavitary vascular surgical interventions.

Methods: Consecutive patients (n = 872) who underwent carotid endarterectomy, endovascular aneurysm repair, femoral and infrainguinal reconstructions, or major amputations (n = 1354 operations) were stratified on quintiles of propensity scores calculated as their probability to continue uninterrupted use of clopidogrel in the perioperative period. The propensity score was calculated on the basis of operation type, demographics, and comorbidities, including the revised cardiac risk index. Random effects linear, logistic, and Poisson regression were used to model outcomes.

Results: There was a trend for increased incidence of hematomas in the clopidogrel group (odds ratio [OR], 2.39; 95% confidence interval [CI], 0.99-5.8; $P = .052$); however, the incidence of severe bleeding that necessitated take-back (OR, 0.75; 95% CI, 0.14-4.03; $P = .74$) and the perioperative mortality and cardiac complications (OR, 0.99; 95% CI, 0.49-1.72; $P = .8$) were similar. Furthermore, wound complications (OR, 1.14; 95% CI, 0.64-2.03; $P = .65$), intraoperative blood loss (coefficient, 12.8; 95% CI, −54 to 29 mL; $P = .55$), intraoperative blood transfusion (coefficient, −0.1; 95% CI, −0.3 to 0.11 units; $P = .4$), postoperative blood transfusion (coefficient, − 0.07; 95% CI, −0.35 to 0.2 units; $P = .6$), and operative time (coefficient, −10.4 minutes; 95% CI, −28.3 to 7.45 minutes; $P = .25$) were all comparable between the groups. The postoperative length of stay (median 4 vs 5 days; incidence rate ratios, 1.15; 95% CI, 1.04-1.27; $P = .002$) and the intensive care unit length of stay (median 1 vs 2 days; incidence rate ratios, 1.24; 95% CI, 1.03-1.5; $P = .02$) were longer in the clopidogrel group. Interaction terms between age or procedure type and clopidogrel for the above end points were all statistically nonsignificant.

Conclusions: Uninterrupted perioperative use of clopidogrel in patients undergoing extracavitary vascular operations is associated with a marginal increase in hematoma formation and postoperative and intensive care unit length of stay. Wound complications, cardiac complications, perioperative mortality, and perioperative transfusion needs are not affected by clopidogrel administration. These findings were consistent across all age groups and procedure types under investigation. On the basis of this data, uninterrupted perioperative use of clopidogrel is justified in patients undergoing the operation types we examined.

Initial Procedural Analysis of the Treatment of Iliac Artery Disease With Orbital Atherectomy

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Objectives: Atherectomy has been shown to effectively treat femoropopliteal disease, but very little has been reported on its usefulness in iliac artery disease. The objective of our study was to provide an initial evaluation of the safety and efficacy of orbital atherectomy in treating iliac artery lesions.

Methods: This was a retrospective, multicenter study of patients treated with orbital atherectomy between November 2009 and July 2011. Periprocedural data were collected on an intent-to-treat basis and included patient and lesion characteristics, procedural characteristics, results, and complications.

Results: A total of 85 iliac artery lesions in 79 patients (58% men; mean age, 70 ± 2 years) were treated, with a median Rutherford stage of 3 (range, 1-6). Most lesions were de novo (96%) with a mean stenosis diameter of 86% ± 2% (occluded in 5 [6%]) and a mean length of 45 ± 8 mm (range, 2-200 mm). Plaque morphology included lesions that were >75% calcified in 50 (60%); 50% to 75% calcified in 29 (35%); 25% to 50% calcified in zero (0%); <25% calcified in one(1%); fibrotic in 4 (5%); and soft plaque in zero (0%). Orbital atherectomy achieved a mean stenosis reduction of 39% ± 4% with stand-alone treatment. Angioplasty was performed in 73 patients (86%). The mean maximum inflation pressure was 6.4 ± 0.7 mm Hg (range, 1-12 mm Hg) and achieved a mean residual stenosis of 11% ± 3%. Stents were placed in 37 patients (44%). Embolic protection was not used in these procedures. The procedural success rate was 96%. There were no deaths, and the complication rate was 8%. Complications included acute thrombosis in one (1%), embolism in one (1%), dissection in four (5%), and perforation in one (1%).

Conclusions: Initial assessments show orbital atherectomy to be safe and effective in treating peripheral arterial disease of the iliac artery. Further studies are necessary to determine patency, limb salvage, and cost effectiveness of these procedures compared with other treatment modalities.

Contemporary Results of Carotid Endarterectomy (CEA) in "Normal-Risk" Patients From the Society for Vascular Surgery (SVS) Vascular Registry

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Objectives: "Acceptable" complication rates after CEA are drawn from data that are decades old. The CREST trial demonstrated improved outcome after CEA but may not represent "real-world" results. Results of carotid stenting (CAS) in "normal-risk" (NR) patients are limited. This study was done to determine "real-world" contemporary results of CEA in NR patients.

Methods: The Society for Vascular Surgery Vascular (SVS) Registry was examined to determine in-hospital and 30-day event rates for NR symptomatic (SX) and asymptomatic (ASX) patients undergoing CEA. NR is defined as patients without anatomic or physiologic risk factors, as defined by SVS Carotid Practice Guidelines. Raw data and risk-adjusted rates of death, stroke, and myocardial infarction (MI) were compared between the ASX and SX cohorts.

Results: There were 3977 patients (2521 ASX, 1456 SX) available for comparison. SX had 62% men vs 57% in ASX ($P = .004$), and ASX had a greater proportion of Caucasian patients (94.4%) vs 91.3% in SX ($P = .0002$), with a higher rate of coronary artery disease and MI (both $P < .001$), peripheral vascular disease ($P = .001$), and hypertension ($P = .029$). More ASX had baseline stenosis >80% by ultrasound imaging (68% vs 54% in SX, $P < .0001$). Ninety-eight percent of both groups were New York Heart Association grade ≤3, and 90% were taking antiplatelet agents preoperatively. ASX had lower perioperative (0.8% ASX, 2.7% SX) and 30-day (1.0% ASX, 3.4% SX) stroke rates ($P < .0001$), which contributed to the lower rates of composite death, stroke, and MI perioperatively (1.7% ASX, 3.6% SX; $P = .0003$) and at 30 days (2.2% ASX vs 4.5% SX; $P < .0001$). Raw and risk-adjusted rates of death and MI did not differ between groups. Absolute and risk adjusted perioperative stroke was increased in SX (odds ratio, 2.9; $P = .004$).

Conclusions: Contemporary results of CEA have improved, are similar to CREST, and are better than established norms for SX and ASX patients. These results should serve as a benchmark for comparing results of alternative therapies for treatment of carotid stenosis in NR patients.